AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. – 27. (Cancelled)

28. (Currently Amended) A spectroscopic system for measuring thickness of a planar material using interferometry internal to the material, the system comprising:

a quasi-monochromatic, tunable infra-red light source which provides wavelengths of light varied in increments of less than 0.5 nm~~, and wherein the wavelengths of light are not completely absorbed by the material to be measured~~;

a photodetector that detects light reflected from or transmitted through the material; ~~and~~

a computing device to calculate the material's transmission or reflectivity based on an interference signal from the photodetector, and wherein the material's transmission or reflectivity is used to calculate the thickness of the material based on a knowledge of a material's refractive data; and

wherein the material to be measured has a thickness of 1 to 1000 microns, and the wavelength of operation of the light source is greater than 1000 nm.

29. (Currently Amended) The system of Claim 28, further comprising a ~~beam splitter~~ beamsplitter, wherein the ~~beam splitter~~ beamsplitter ~~splits~~ divides the beam of light from the ~~wavelength~~ light source into a measurement light path and a reference light path, and wherein the measurement light path is directed to the material, and wherein the reference light path is used to calibrate light wavelength.

30. (Currently Amended) The system of Claim 29, further comprising a photosensitive detector that detects a ~~the~~ reference light signal.

31. (Previously Presented) The system of Claim 28, wherein the tunable light source provides wavelengths of light varied in increments less than 0.1 nm.

32. (Previously Presented) The system of Claim 28, wherein the light source provides a beam of light to the material, and wherein the incident light angle is less than ± 5° from normal.

33. (Currently Amended) The system of Claim 28, wherein the material to be measured is a silicon ~~or GaAs wafer or~~ layer having a thickness of 1 to 1000 microns~~, and wherein the wavelength of operation of the light source is greater than 1000 nm~~.

34. (New) The system of Claim 28, wherein the material to be measured is a GaAs layer having a thickness of 1 to 1000 microns.

35. (New) The system of Claim 28, wherein the material to be measured is a dielectric layer having a thickness between 10 and 2000 microns.

36. (New) The system of Claim 28, wherein the material to be measured must be partially transparent to the wavelengths of light.

37. (New) A spectroscopic system for measuring thickness of a planar material using interferometry internal to the material measured comprising:

a quasi-monochromatic infra-red light source able to vary its wavelength in increments of less than one nanometer;

a photodetector to measure the reflected or transmitted light;

a computing device to calculate the material's transmission or reflectivity based on the interference signal from the detector, and wherein the material's transmission or reflectivity is used to calculate the thickness of the material based on a knowledge of a material's refractive data; and

wherein the material to be measured has a thickness of 1 to 1000 microns, and the wavelength of operation of the light source is greater than 1000 nm.

38. (New) The spectroscopic system according to claim 37, further wherein the quasi-monochromatic infra-red light source varies its wavelength in increments of less than one nanometer over a range of at least 30 nm.

39. (New) The spectroscopic system according to claim 37, wherein the material measured is a silicon layer having a thickness of between 1 and 1000 microns.

40. (New) The spectroscopic system according to claim 37, wherein the material measured is a GaAs layer having a thickness of between 1 and 1000 microns.

41. (New) The spectroscopic system according to claim 37, wherein the material measured is a dielectric layer having a thickness of between 10 and 2000 microns.

42. (New) The spectroscopic system according to claim 37, further comprising a beamsplitter either internal to the light source system or external, which divides the light into a reference path used to calibrate the wavelengths of light;

43. (New) The spectroscopic system according to claim 42, wherein the photodetector comprises:

a first detector that detects light from the light source either reflected from or transmitted through the material; and

a second detector that detects the reference light.

44. (New) The spectroscopic system according to claim 43, wherein the first detector is a photodiode sensor.

45. (New) The spectroscopic system according to claim 37, wherein the tunable infra-red light source provides wavelengths of light varied in increments less than 0.5 nm.

46. (New) The spectroscopic system according to claim 43, wherein the first detector detects light reflected from the material.

47. (New) The spectroscopic system according to claim 43, wherein the first detector detects light transmitted through the material.

48. (New) The spectroscopic system according to claim 37, wherein the light source provides a beam of light to the material, and wherein the incident light angle is less than ± 5° from normal.

49. (New) A method of measuring material thickness, wherein the method comprises:

loading a material to be measured into a holder of a spectroscopic system, the material having a thickness of 1 to 1000 microns, wherein the system comprises:

a quasi-monochromatic infra-red light source having a wavelength of operation of greater than 1000 nm, and wherein the light source is able to vary its wavelength in increments of less than one nanometer;

a photodetector to measure the reflected or transmitted light; and

a computing device to calculate the material's transmission or reflectivity based on the interference signal from the detector, and wherein the material's transmission or reflectivity is used to calculate the thickness of the material based on a knowledge of a material's refractive data;

measuring the light reflected from or transmitted through the material at at least two different wavelengths using the photodetector; and

computing material thickness using a computing device based on data received from the detector.

50. (New) The method according to claim 49, wherein the detector is a photodiode sensor.

51. (New) The method according to claim 49, wherein the two different wavelengths vary by less than 0.5 nm.

52. (New) The method according to claim 49, wherein the method is used to measure material thickness in the range of 1 microns to 1000 microns.

53. (New) The method according to claim 49, wherein the method provides a repeatability of thickness measurement of less than 1%.

54. (New) The method according to claim 49, wherein the tunable light source provides wavelengths of light varied in increments less than 0.5 nm.

55. (New) The method according to claim 49, wherein computing the material thickness comprises:

measuring sample reflectivity or transmission and etalon transmission at a fixed wavelength point;

varying the wavelength at which measurements of reflectivity or transmission are measured;

repeating the steps of measuring sample reflectivity or transmission and etalon transmission at a fixed wavelength point and varying the wavelength at which measurements of reflectivity or transmission are measured over a number of points to provide a number of sample signals and etalon signals; and

using data obtained from the sample signals and etalon signals to calculate material thickness.

56. (New) The method according to claim 55, wherein computing the material thickness further comprises:

measuring and saving values for a reference;

using the reference values to convert sample signals to reflectivity values; and,

using the reflectivity values to calculate material thickness.

57. (New) The method according to claim 56, wherein computing the material thickness further comprises:

computing a theoretical model of sample reflectivity, wherein the model includes values; and,

varying the value of sample thickness until a best fit occurs between theoretical sample reflectivity values and measured sample reflectivity values, which provides a material thickness.

58. (New) The method according to claim 57, wherein a curve-fitting technique is used to fit the theoretical model of sample reflectivity and measured reflectivity values.